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None

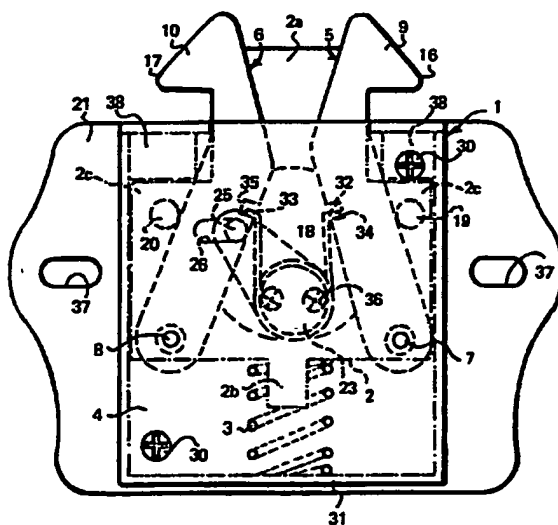
(58) Field of Search

UK CL (Edition M) E2A AMXE AMXG AMXW

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(54) Lock assembly

(57) A hook-bolt lock assembly has hook-bolt plates (5, 6) and can be locked without inserting a key into a lock unit (22) to improve its operability. A movable plate (2) is biased by a spring (3) toward its projecting direction; the plates (5, 6) are pivoted to a casing (1); oblique cam surfaces (16, 17) of front-ends hooks (9, 10), which abut on socket members (14, 15) of a stationary frame (13) when a door (12) is closed, are orientated outwardly; a leaf spring (18) interposed between the plates (5, 6) biases them (5, 6) swingably outwardly; the movable plate (2) has projections (19, 20) abutting on outer edges (5a, 6a) of the plates (5, 6); a rear end of a rotor (23) of the unit (22) fixed to the casing (1) is fixed to a base end of an operating-arm plate (24); and a front-end projection (25) of the plate (24) is inserted in a slot (26) of the plate (2).



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FIG. 2

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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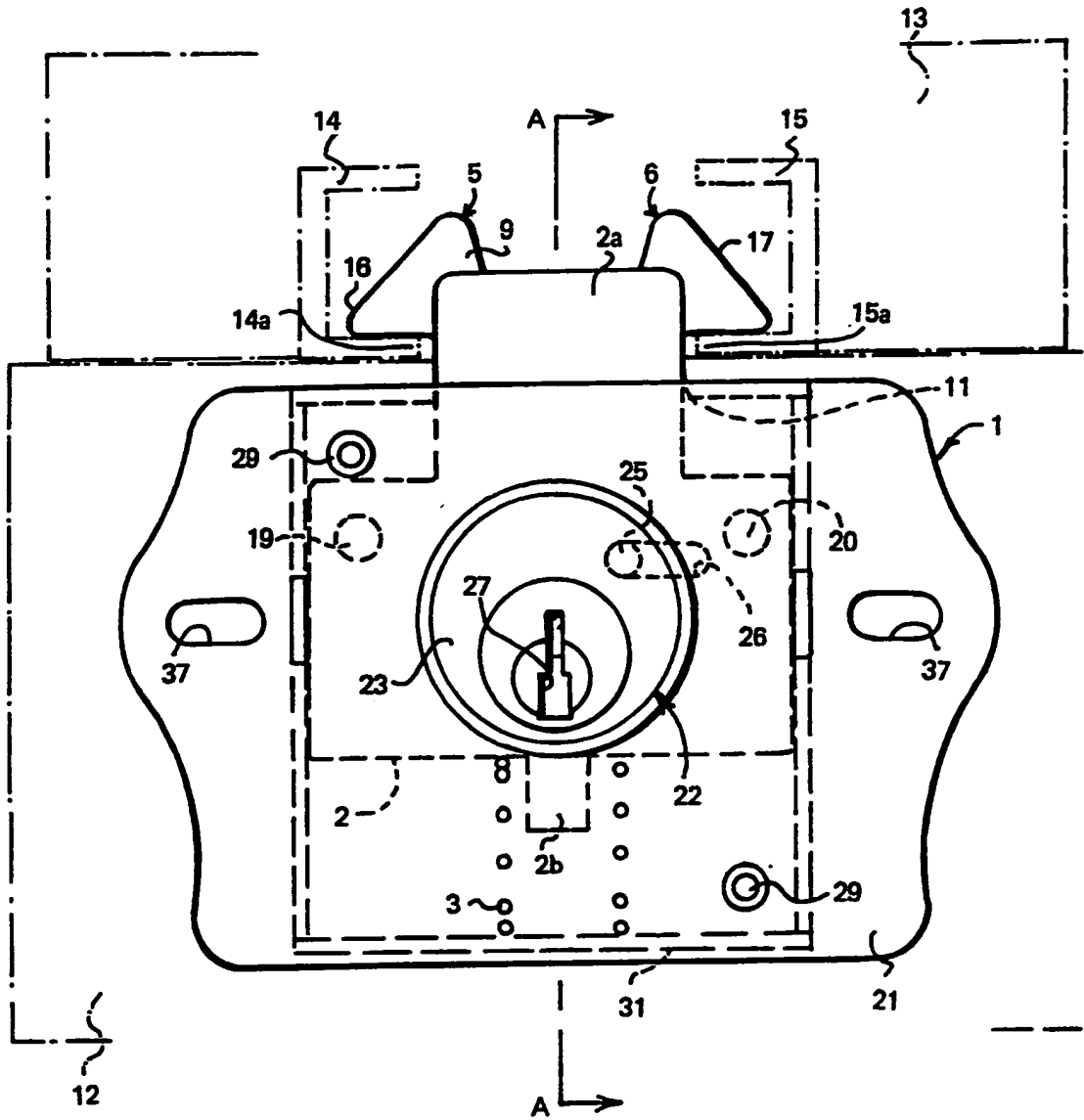


FIG. 1

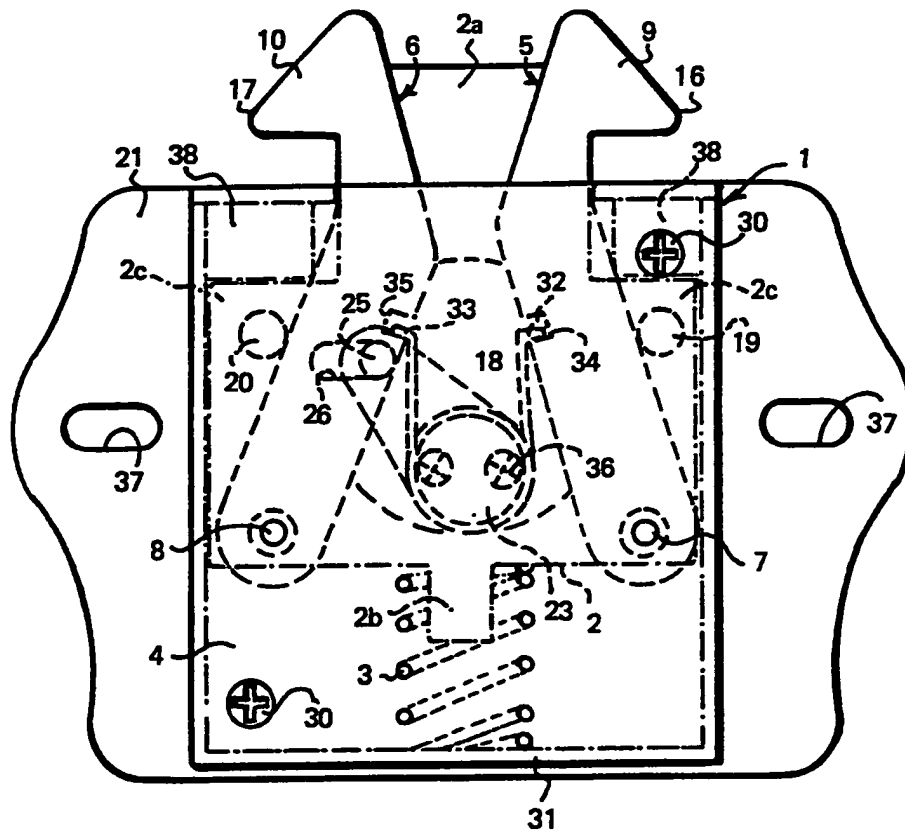


FIG. 2

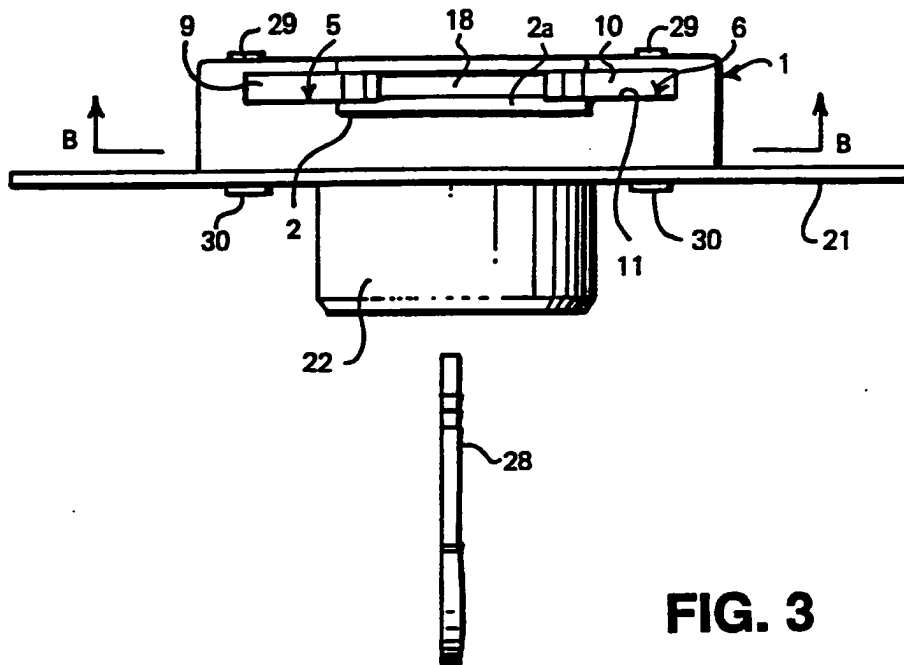


FIG. 3

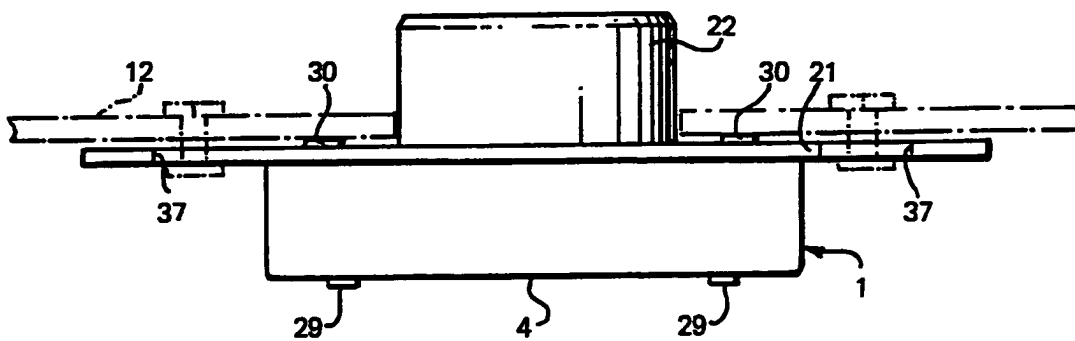


FIG. 4

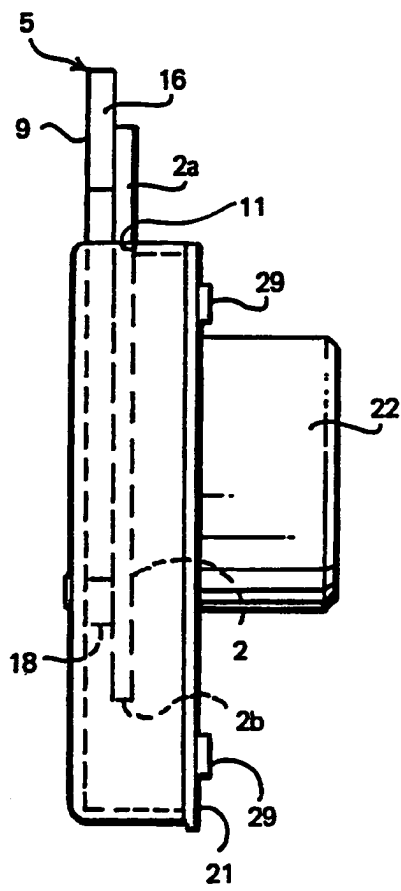


FIG. 5

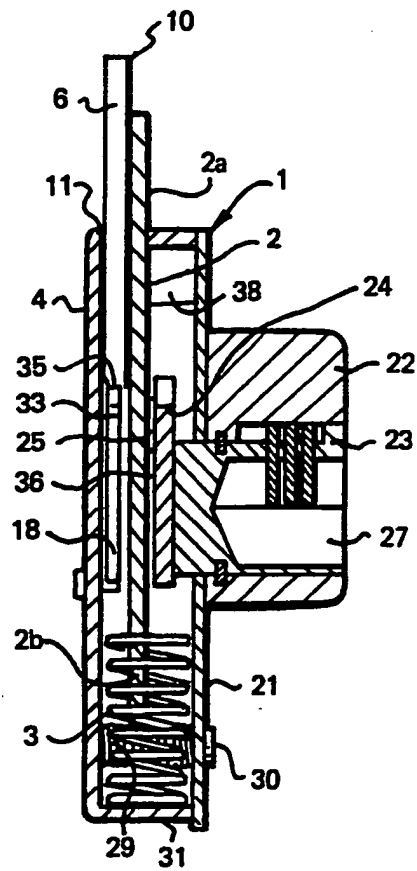


FIG. 6

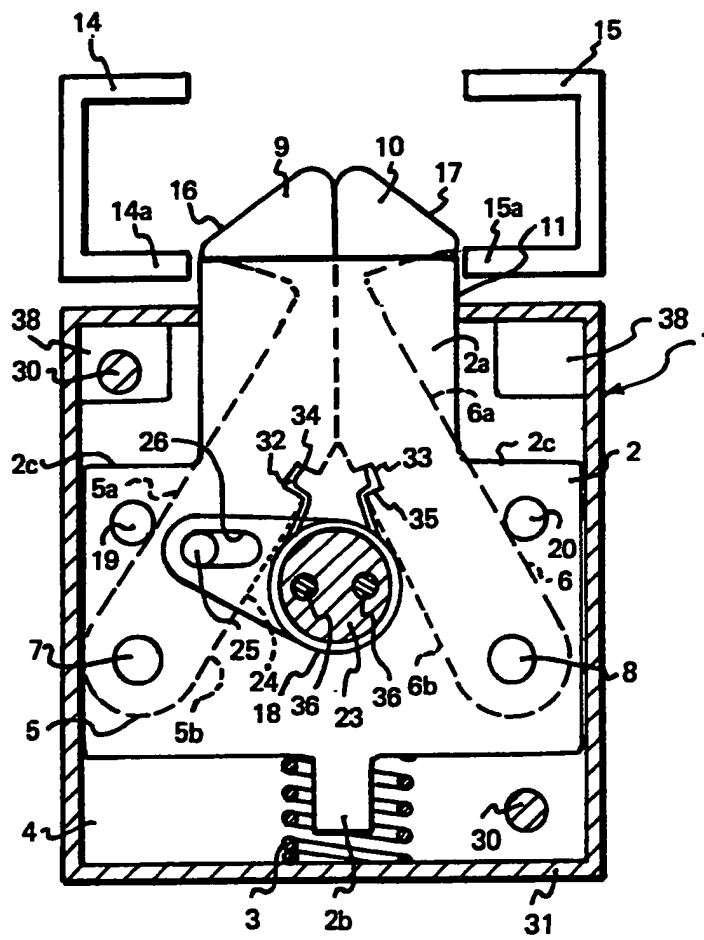


FIG. 7

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DESCRIPTION

LOCK ASSEMBLY

The present invention relates to lock assemblies, and in particular but not exclusively, to hook-bolt lock assemblies for locking a door to a stationary frame element, in which a hook plate having its base-end portion pivoted to a casing has its front-end hook portion engaged with a socket member so that the door is locked to the stationary frame element.

In a conventional hook-bolt lock assembly, since only one hook-bolt plate is engaged with and disengaged from a socket member, the assembly is poor in mechanical strength. In addition, when the hook-bolt plate is swung from its engaging position toward its disengaging position, and vice versa, it is necessary for a user to insert a key into a rotor of a lock unit mounted on a front plate of a casing to have an operating arm rotated in a predetermined direction. However, such operation is cumbersome.

It is an object of the present invention to provide a hook-bolt lock assembly provided with a pair of hook-bolt plates which improve the mechanical strength of the assembly and eliminate the necessity of inserting a key into a lock unit when the assembly is locked, which improves the operability of the assembly. The above object of the present invention is accomplished by providing:

A lock assembly comprising:

a movable plate which is slidably mounted in a casing and biased toward its projecting direction by a spring;

a pair of symmetrically-arranged hook-bolt plates having their base-end portions pivoted to an intermediate portion of a rear-surface plate of the casing;

the hook-bolt plates having their front-end hook portions projecting outward from an end-surface opening portion of the casing;

the front-end hook portions abutting against a pair of socket members of a stationary frame element when a door is closed, each having an oblique cam surface oriented outward, respectively;

a leaf spring interposed between the hook-bolt plates to pivotally bias them outward;

the movable plate being provided with a pair of cam projections each of which abuts against an outer edge surface of a hook-bolt plate; and

a lock unit which is fixedly mounted on a front plate of the casing, and has a rear-end portion of its rotor fixed to a base-end portion of an operating-arm plate which has a driving projection on its front-end portion inserted into a slot in the movable plate.

By way of example only, a specific embodiment of the present invention will now be described, with reference to the accompanying drawings, in which:-

Fig. 1 is a front view of a door carrying an embodiment of the hook-bolt lock assembly of the present invention in its locked condition;

Fig. 2 is a rear view of the hook-bolt lock assembly of the present invention shown in Fig. 1;

Fig. 3 is a plan view of the hook-bolt lock assembly of the present invention shown in Fig. 1;

Fig. 4 is a bottom view of the hook-bolt lock assembly of the invention shown in Fig. 1;

Fig. 5 is a left side view of the hook-bolt lock assembly of the present invention shown in Fig. 1;

Fig. 6 is a sectional view of the hook-bolt lock assembly of the present invention, taken along

the line A-A of Fig. 1; and

Fig. 7 is a sectional view of the hook-bolt lock assembly of the present invention, taken along the line B-B of Fig. 1, in a condition in which the hook-bolt lock assembly is unlocked.

Hereinbelow, the present invention will be described in detail with reference to the accompanying drawings and the reference numerals and characters.

In a hook-bolt lock assembly of the present invention, a movable plate 2 is slidably mounted in a casing 1, and biased toward its projecting direction by a spring 3. A pair of hook-bolt plates 5 and 6 are horizontally arranged in the casing 1 in a symmetrical manner, and have their base-end portions pivoted to an intermediate portion of a rear-surface plate 4 of the casing 1 through a pair of pivots 7 and 8, respectively. Further, the hook-bolt plates 5 and 6 have their front-end hook portions 9 and 10 projected outward from an end-surface opening portion 11 of the casing 1. The front - end hook portions 9 and 10 abut against a pair of socket members 14 and 15 of a stationary frame element 13 when a door 12 is closed, and have their oblique cam surfaces 16 and 17 oriented outward.

A leaf spring 18 is interposed between the hook-bolt plates 5, 6 to pivotally bias them outward. The movable plate 2 is provided with a pair of cam projections 19 and 20 which abut against outer edge surfaces 5a and 6a of the hook-bolt plates 5 and 6,

respectively. A lock unit 22 is fixedly mounted on a front plate 21 of the casing 1, and has a rear-end portion of its rotor 23 fixed to a base-end portion of an operating-arm plate 24 which has a driving projection 25 of its front-end portion inserted into a slot 26 of the movable plate 2.

As shown in Fig. 1, in a condition in which the door 12 is locked to the stationary frame element 13, the pair of horizontally arranged hook-bolt plates 5 and 6 engage with the corresponding horizontally arranged pair of socket members 14 and 15, respectively. In this condition, the movable plate 2 is in its most projected position. On the other hand, the operating arm 24 is in its highest position and has its driving projection 25 engaged with an inner end portion of the slot 26 of the movable plate 2.

When the key 28 is inserted in a key hole 27 of the rotor 23 to rotate the rotor 23 clockwise, the operating arm 24 is rotated which causes its driving projection 25 to move in the slot 26 of the movable plate 2 and eventually abut against the inner wall surface of the slot 26 of the movable plate 2 in order to push the plate 2. As a result, the movable plate 2 is retracted in the casing 1 against a resilient force exerted by the spring 3. At this time, the cam projections 19 and 20 of the movable plate 2 push the outer edge surfaces 5a and 6a of the hook-bolt plates 5 and 6, respectively.

Consequently, the hook-bolt plates 5, 6 are pivoted inwardly against a resilient force exerted by the leaf spring 18, causing their front-end hook

portions 9, 10 to abut against each other back to back. In this stage of operation, the front-end hook portions 9 and 10 of the hook-bolt plates 5 and 6 are disengaged from the socket members 14 and 15, respectively. As a result, the door 12 is released from the stationary frame element 13 so that the user may open the door by pulling an appropriate handle means of the door forward.

After the door is opened, the key is pulled out of the rotor 28. As a result, as shown in Fig. 2, the movable plate 2 is slidably moved in its projecting direction under the influence of the resilient force exerted by the spring 3 so that each of the hook-bolt plates 5, 6 returns to its initial position in which each of the front-end hook portions 9, 10 is moved outward to maximum extent.

When the door 12 is closed, at the last stage in such closing operation of the door 12, the oblique cam portions 16 and 17 of the front-end hook portions 9 and 10 abut against the front edge portions 14a and 15a, respectively. Consequently, each of the hook-bolt plates 5, 6 is pivoted inwardly against the resilient force exerted by the leaf spring 18. As soon as the front-end hook portions 9 and 10 of the hook-bolt plates 5 and 6 have passed through the front edge portions 14a and 15a of the socket member 14 and 15, respectively, the hook-bolt plates 5, 6 are pivoted outward under the influence of the resilient force exerted by the leaf spring 18 so that their front-end hook portions 9 and 10 are automatically engaged with

the socket members 14 and 15, respectively.

In the embodiment of the present invention shown in the drawings, a pair of horizontally arranged mounting holes 37 are provided in the front plate 21 of the casing 1. The front plate 21 of the casing 1 is connected with the casing body through a plurality of spacer sleeves 29 and screws 30. An upper end portion 2a of the movable plate 2 projecting upward from the end-surface opening portion 11 of the casing 1 covers root portions of the front-end hook portions 9, 10 of the hook-bolt plates 5, 6 to protect these plates 5, 6 from damage.

The spring 3 for biasing the movable plate 2 is constructed of a compression coil spring which is mounted on a spring-support plate portion 2b of the base-end portion of the movable plate 2 to abut against a lower-end plate 31 of the casing 1. The leaf spring 18 assumes a U-shaped bent form, and has its front-end bent portions 32 and 33 inserted in spring-support notches 34 and 35 of the inner edge portions of the hook-bolt plates 5 and 6, respectively. The operating-arm plate 24 is fixedly mounted on the rotor 23 by means of screws 36. The casing 1 is provided with a plurality of stopper portions 38 against which a plurality of horizontally-arranged left and right shoulder portions 2c of the movable plate 2 can abut.

In the hook-bolt lock assembly of the present invention having the above construction the pivotable operation of the operating-arm plate 24

retracts the movable plate 2 further into the casing 1; and the pair of horizontally-arranged left and right hook-bolt plates 5, 6 are pivoted in their disengaging directions relative to the corresponding socket members 14, 15 by the cam projections 19, 20 of the movable plate 2. In

the assembly, since there are two hook-bolt plates the assembly is improved in mechanical strength to withstand an intensive pulling force applied to the door 12 in its locked condition.

Further, when the door 12 is closed, it is possible for the user to close the door 12 by simply pushing the door 12 without inserting the key 28 into the rotor 23 to rotate the operating-arm plate 24, because the oblique cam surface portions 16, 17 of the front-end hook portions 9, 10 abutting against the socket members 14, 15 mounted on the stationary frame element 13 are oriented outward in arrangement; and the leaf spring 18 interposed between the hook-bolt plates 5, 6 pivotally biases these plates 5, 6 outward; whereby the hook-bolt plates 5, 6 are automatically engaged with the corresponding socket members 14, 15 when the door 12 is closed. Consequently, the hook-bolt lock assembly of the present invention is improved in operability.

Furthermore, in the hook-bolt lock assembly of the present invention, since a means for biasing the pair of horizontally-arranged left and right hook-bolt plates 5, 6 is constructed of the single leaf spring 8, the assembly of the present invention is simple in construction, and therefore may be assembled at low cost in manufacturing.

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CLAIMS

1. A lock assembly comprising:

a movable plate which is slidably mounted in a casing and biased toward its projecting direction by a spring;

a pair of symmetrically-arranged hook-bolt plates having their base-end portions pivoted to an intermediate portion of a rear-surface plate of said casing;

said hook-bolt plates having their front-end hook portions projecting outward from an end-surface opening portion of said casing;

said front-end hook portions abutting against a pair of socket members of a stationary frame element when a door is closed, each having an oblique cam surface oriented outward;

a leaf spring interposed between said hook-bolt plates to pivotally bias them outward;

said movable plate being provided with a pair of cam projections each of which abuts against an outer edge surface of a hook-bolt plate; and

a lock unit which fixedly mounted on a front plate of said casing, and has a rear-end portion of its rotor fixed to a base-end portion of an operating arm plate which has a driving projection on its front-

end portion inserted into a slot in said movable plate

2.

2. A hook-bolt lock assembly substantially as herein described, with reference to, and as illustrated in, the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under Section 17
(The Search report)

Application number
GB 9403136.6

- 11 -

Relevant Technical Fields

(i) UK Cl (Ed.M) E2A (AMXE, AMXG, AMXW)

(ii) Int Cl (Ed.5) E05C 3/34

Search Examiner
A ANGELE

Date of completion of Search
28 APRIL 1994

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii)

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